



REPORT RENEWABLE ELECTRICITY IN PORTUGAL

Monthly Edition

November 2018



RENEWABLE ELECTRICITY IN MAINLAND PORTUGAL

Highlights of the Portuguese Power Sector

- Up until the end of November 2018, renewable energy sources accounted for a 52,8 % share over the total electricity production in mainland Portugal.
- The electricity demand registered an accumulated 1,7 % growth in 2018 (until the end of November), already considering the temperature and working days correction, thus giving continuity to the growth trend already identified in 2016 (0,4 %) and 2017 (1,4 %).
- As for the average MIBEL price, it recorded 57,04 €/MWh over the accumulated period, comprising a 10 % increase in comparison to 2017 values.



Electricity Production Profile in mainland Portugal

Until the end of November 2018, 52,8 % (26 680 GWh) of the overall electricity production in mainland Portugal derived from renewable energy sources, and the remaining 47,2 % (23 850 GWh) was produced by fossil fuels, for a total electricity production of 50 530 GWh.

The largest renewables contribution was addressed by hydro technology, which represented 24,0 % of the electricity mix and resulted in an accumulated hydroelectric producibility index of 1,12. Wind power contributed with 22,2 % and resulted in an accumulated wind producibility index of 1,01. The remaining renewable energy sources represented a combined contribution of 6,5 %, with 5,0 % from bioenergy and 1,5 % from solar. On the other hand, and considering the fossil fuels cluster, coal-fired power plants represented the largest share, with a 19,9 % contribution, while natural gas accounted for

19,1 % of the overall electricity mix, with the remaining 8,3 % being produced by fossil fuel cogeneration. These values reflect a reduction in the contribution from both natural gas and coal power plants in comparison to last year, since the 2017 values were 25,2 % and 25,0 %, respectively. This is explained by the 2018 hydro production increase.

Up until the end of November, electricity demand for mainland Portugal (46 494 GWh) rose by 1,7 % in comparison to the previous year, if considering the temperature and number of working days effect correction. November's electricity demand registered a 5,0 % increase over the preceding year (2,9 % with temperature and working days correction).

When it comes to international trade, there was a net export balance of 2 639 GWh, resulting from a gross exportation of 5 216 GWh and an importation of 2 577 GWh.

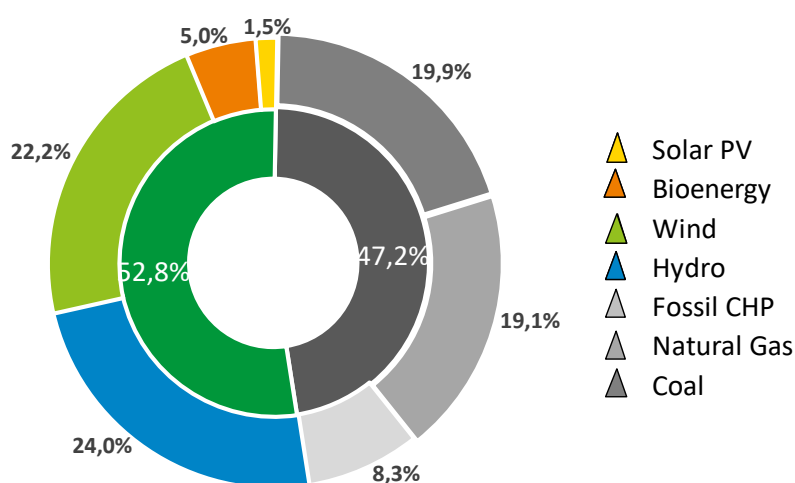


Figure 1: Electricity generation by energy source in mainland Portugal (January to November 2018).

Source: REN; APREN's analysis



Electricity Market

The average MIBEL price up until the end of November was 57,04 €/MWh, thus representing a 10 % increase over the same period of 2017.

Despite the electricity market price increase, the rise in renewable energy production, denoted since September, has been a driver to the reduction in the electricity price (Figure 2) from 71,30 €/MWh to the current 62,01 €/MWh.

It is important to emphasize the market price dynamics in line with the renewable energy

production which, given renewables' low market price, reduces the overall value in a scenario with a greater share of renewables.

In fact, for the 654 hours of 100% renewable production (meaning the renewable energy production equalled or exceeded the electricity demand) recorded, since the beginning of the year, an average price of 37,09 €/MWh, which is significantly lower than the average market price until November (57,04 €/MWh).

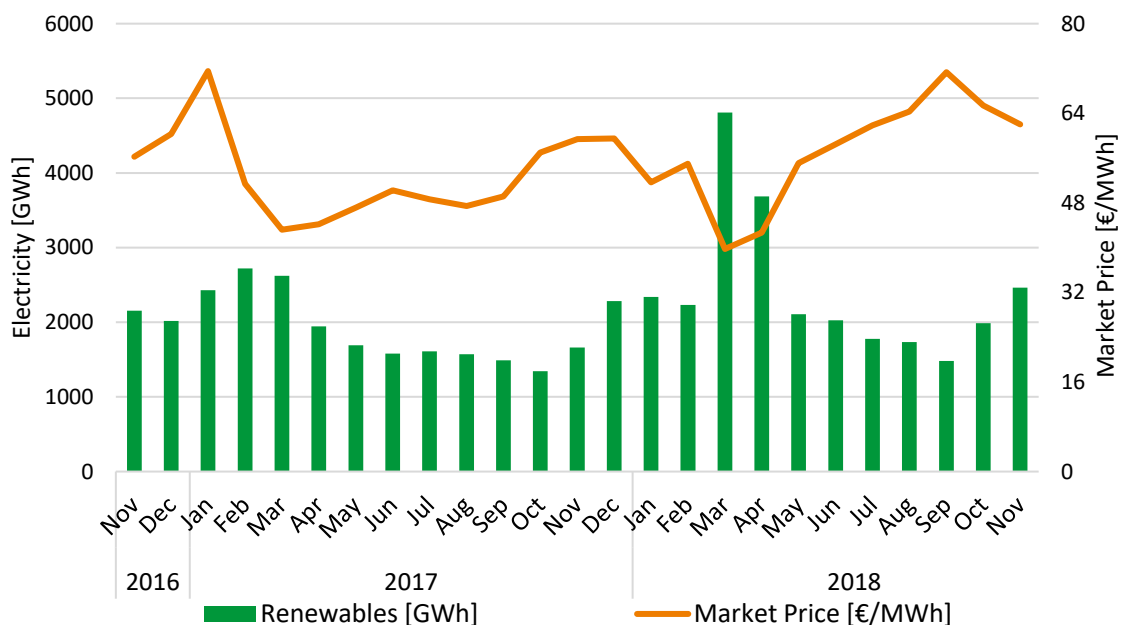


Figure 2: Renewable Electricity Production and Iberian Wholesale Electricity Price (November 2016 to November 2018).

Source: OMIE, REN; APREN's analysis



Production profile for the last 2 years

Figure 3 shows the electricity production profile for the last two years, with a considerable increase in the renewable energy sources contribution to the electricity production mix, both compared to last month and November 2017.

This increase in the renewables representativeness was mainly due to a growth in the wind power production, characterized by a monthly wind producibility index of 1,12.

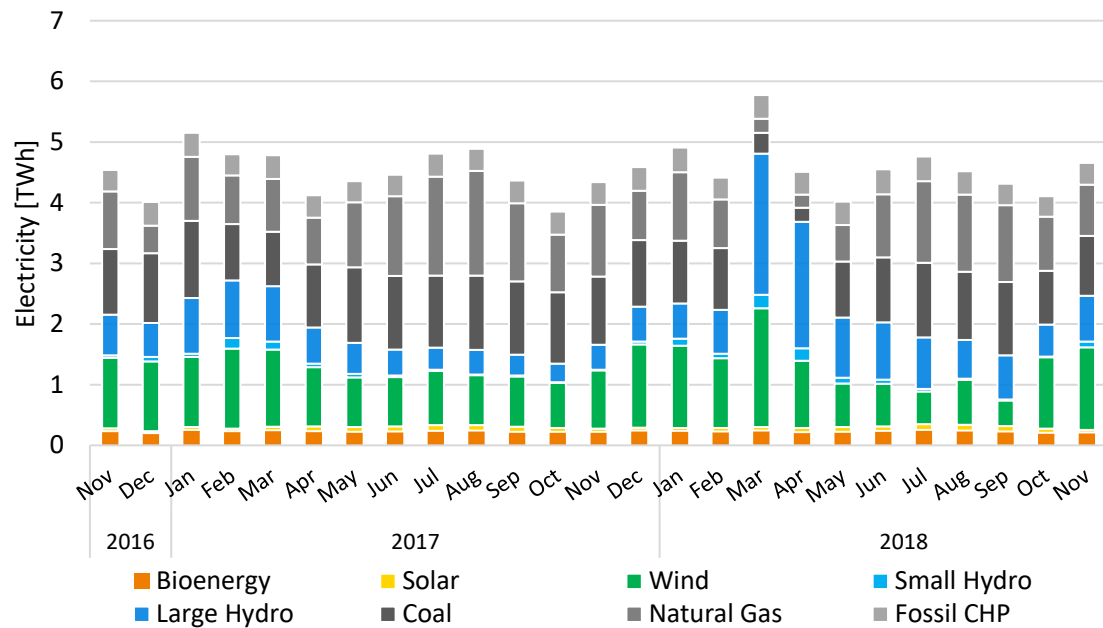


Figure 3: Electricity production distribution by energy source in mainland Portugal (November 2016 to November 2018).

Source: REN; APREN's analysis



November's Load Diagram

As a complement to the information depicted in the previous section, it is presented in Figure 4 the electricity production diagram for the current month, for which it can be highlighted the high wind power penetration, characterized by an approximate 36 % load factor. On the other hand, fossil fuels represented approximately 47 % of the electricity mix.

The electricity production peaks are easily identifiable, denoting a maximum renewable energy production of 7 204 MW on the 17th at 6pm, thus exceeding the electricity demand for the same instant (6 356 MW).

Between November 19th and 24th, the electricity production largely exceeded the demand during peak times (averaging a 25% surplus over the electricity demand), thus representing a great exportation period from

the Iberian Peninsula to other European countries. In fact, during this period, there were significant electricity market price peaks in France (Figure 5), leading an increase over the Iberian market prices (daily average of 65,35 €/MWh).

These high electricity prices for France were a clear result from a significant decrease in temperatures and the consequent increase in the electricity demand, altogether with a substantial nuclear power unavailability, which registered a 70% capacity availability, whereas this value for winter months is typically higher than 85%. This upsurge in electricity prices was also depicted for Belgium (with prices over 490€/MWh), as a result from the unavailability of two nuclear power plants due to maintenance works, in order to guarantee safety operational standards.

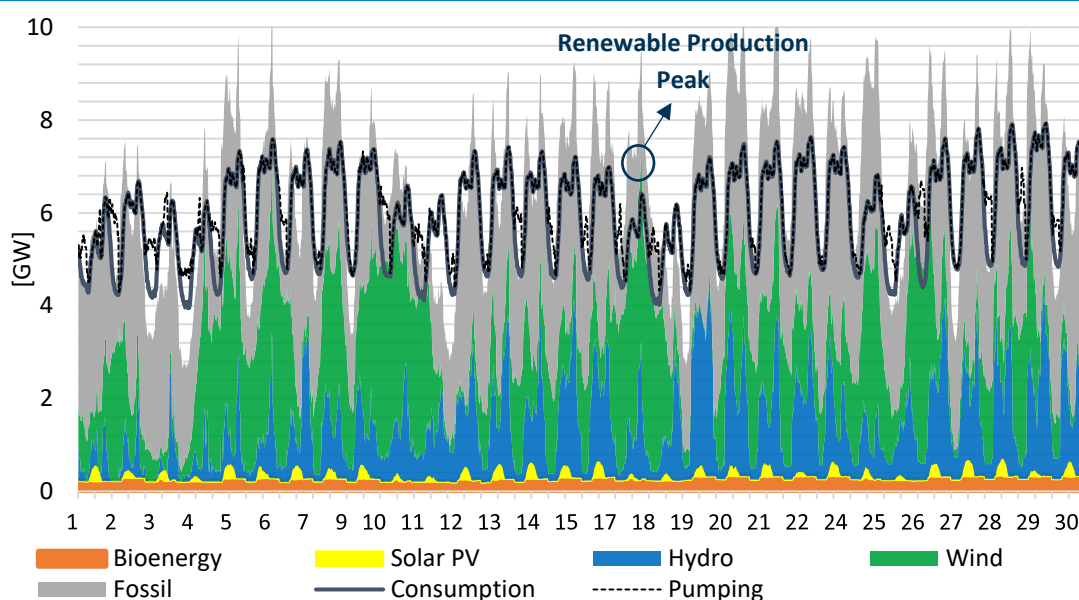


Figure 4: Load Diagram for mainland Portugal (November 2018).

Source: REN; APREN's analysis

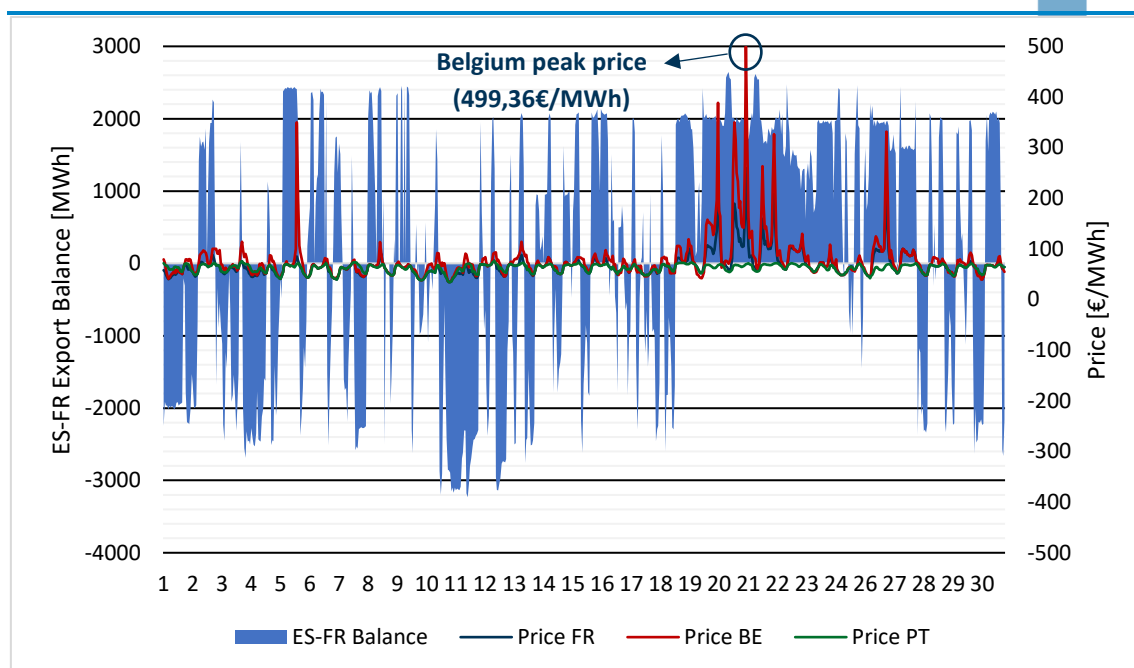


Figure 5: Spain-France Export balance and electricity prices for Portugal, Belgium and France (November 2018).

Source: REN; APREN's analysis

Information available in:

APREN | Communication and Technical Departments

Av. Sidónio Pais, nº 18 R/C Esq. 1050-215 Lisboa, Portugal

Tel. (+351) 213 151 621 | www.apren.pt